

Development of an Engine Air-Brake for Quiet Drag Applications, Phase I

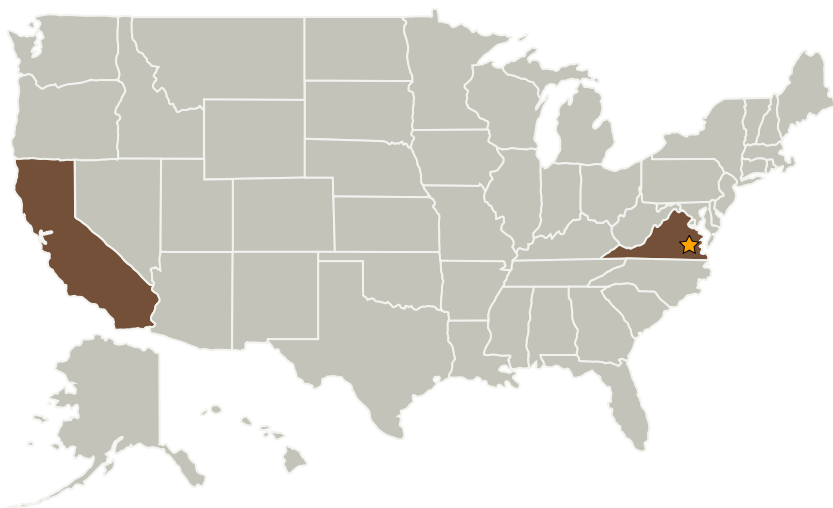
Completed Technology Project (2008 - 2008)



Project Introduction

A novel quiet engine air-brake is proposed in response to NASA's solicitation for concepts for active and passive control of noise sources for conventional and advanced aircraft. The air-brake concept is applicable to 1) next-generation, conventional tube and wing aircraft (current generation +1) and 2) advanced integrated airframe/propulsion system configurations (current generation +2), and could enable system level noise reductions of several decibels at the ground observer during approach by quietly generating drag equivalent to up to three turbofan-sized bluff bodies per powerplant. Such drag generation could enable slower, steeper approach trajectories with reduced need for drag generators such as flaps, slats and undercarriage. Proposed research tasks build upon a rigorous understanding developed by the investigating team on the aero-acoustics of drag generating, swirling exhaust flows. The objectives are to 1) create an engine air-brake design specification to constrain the design and identify and address issues and challenges associated with implementation, 2) perform trade studies on two aircraft/powerplant combinations in current generation +1 and +2 configurations to identify the attributes of suitable devices installed on such aircraft and 3) develop a candidate design for model scale aerodynamic and aeroacoustic validation in an experimental facility. The deliverable will be a written report presenting a conceptual design of a model-scale engine air-brake and proposed test plan for Phase II validation.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Langley Research Center (LaRC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★ Langley Research Center(LaRC)	Lead Organization	NASA Center	Hampton, Virginia
ATA Engineering, Inc.	Supporting Organization	Industry	San Diego, California

Primary U.S. Work Locations

California	Virginia
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Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Parthiv Shah

Technology Areas

Primary:

- TX01 Propulsion Systems
 - └ TX01.3 Aero Propulsion
 - └ TX01.3.1 Integrated Systems and Ancillary Technologies